UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,987	12/31/2003	Neil J. Bershad	42P17667	9976

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EXAMINER
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ART UNIT	PAPER NUMBER
2609	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 December 2003*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All   b)☐ Some *   c)☐ None of:

   1.☐ Certified copies of the priority documents have been received.

   2.☐ Certified copies of the priority documents have been received in Application No. _____.

   3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
     Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

Claim 22 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite

for failing to particularly point out and distinctly claim the subject matter which applicant

regards as the invention.

Part of **Claim 22** recites that the first adaptive filter comprises a number of

coefficients that is less than half a number of coefficients of a full-length adaptive filter.

"number of coefficients of a full-length adaptive filter" is vague and indefinite since the

length of a "full-length adaptive filter" is not specified and what the length of a full

adaptive filter may be at the time of invention may change in the future.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public
> use or on sale in this country, more than one year prior to the date of application for patent in the United
> States.

Claims 1, 5, 6, 8, 9, 13, 15, 16, 20, 22, 23, 25, 26, 28 are rejected under 35

U.S.C. 102(b) as being anticipated by Bershad et al, Patent Application Publication

2002/0093919 (hereinafter referenced as Bershad).

As to **claim 1**, Bershad discloses a method comprising: transforming a signal

(Fig. 1 send input decoder 110); adapting a first adaptive filter (fig. 3 adaptive filter 310,

it is also noted that based on the system model of an adaptive filter depicted in fig. 2,

the plant **210** is capable of modeling the input signal and adapting the signal using the

feedback illustrated in fig. 2) based on the transformed signal, estimating a delay of an

impulse response based on the adaptation of the first filter (fig. 3 delay estimator 320,

paragraph 37); delaying a signal based on the estimated delay (paragraph 58); and

adapting a second adaptive filter based on the delayed signal (fig. 3 adaptive filter 330,

paragraph 38).

It is noted that the send input decoder 110 models the received signal and gives

an output to the adaptive filter, which reads on "transforming a signal". Additionally, The

delay estimator determines the bulk delay in the echo channel (paragraph 37), which

reads on "estimating a delay of an impulse response based on the adaptation of the

first filter". Additionally, Bershad teaches that before the signal reaches the delay

estimator, it is adapted by the first adaptive filter (paragraph 37), which reads on "based

on the adaptation of the first filter". Fig. 4b illustrates that the second adaptive filter

receives a signal based on the delays provided by the delay estimator (paragraph 58),

which reads on "adapting a second adaptive filter based on the delayed signal".

As to **claim 5**, Bershad discloses that estimating the delay comprises identifying

one or more adapted coefficients of the first adaptive filter having extreme values

relative to the other coefficients of the filter. It is noted that paragraph 37 discloses that

the delay estimator 320 determines the bulk delay in the echo channel 120 using the

estimated channel weight vector W provided by the adaptive filter. Additionally, the auto regressive generator illustrated in fig. 4a 410 determines the vector W by completing several iterations and paragraph 66 discloses that the peak locator can determine the maximum value of the weights, which reads on "having extreme values relative to the other coefficients of the filter".

As to **claim 6**, wherein estimating the delay comprises identifying an adapted coefficient having the largest absolute value (paragraph 65 lines 5-8, paragraph 66 lines 1-6).

As to **claim 8**, Bershad discloses reducing an echo based on the adaptation of the second adaptive filter (abstract lines 7-9, paragraph 38).

As to **claim 9**, Bershad discloses a storage medium having stored thereon data representing sequences of instructions that if executed cause an apparatus to function (paragraph 26 lines 1-8). Bershad also discloses the sequence of instructions that correspond to the method steps of claims 1 (see rejection of claim 1).

As to **claim 13**, Bershad discloses a storage medium having stored thereon data representing sequences of instructions that if executed cause an apparatus to perform steps (paragraph 26 lines 1-8). Bershad also discloses the sequence of instructions that correspond to the method steps of claims 6 (see rejection of claim 6).

As to **claim 15**, Bershad discloses a storage medium having stored thereon data representing sequences of instructions that if executed cause an apparatus to perform steps (paragraph 26 lines 1-8). Bershad also discloses the sequence of instructions that correspond to the method steps of claim 8 (see rejection of claim 8).

As to **claim 16**, Bershad discloses an apparatus comprising: a signal transformer (fig.1 send input decoder 110) to transform a signal to a transformed signal; a first adaptive filter (fig. 3 adaptive filter 310) in communication with the signal transformer (fig. 3 adaptive filter 310), the first adaptive filter to adapt based on the transformed signal, a delay estimator (fig. 3 delay estimator 320) in communication with the first adaptive filter, the delay estimator to estimate a delay associated with an impulse response based on the adaptation of the first adaptive filter (paragraph 37); a delayer in communication with the delay estimator (fig. 4b input separator 450), the delayer to delay a signal based on the estimate of the delay (paragraph 58); and a second adaptive filter in communication with the delayer (fig. 3 adaptive filter 330), the second adaptive filter to adapt based on the delayed signal (paragraph 38).

As to **claim 20**, Bershad discloses the apparatus that corresponds to the method steps of claim 6 (see claim 6 rejection).

As to **claim 22**, Bershad discloses that number of coefficients of the second adaptive filter is based on a longest expected impulse response for the channel. Paragraph 38 and 66 disclose that the weight vectors calculated by the adaptive filter 330 correspond to the impulses provided by the delay estimator. Additionally, the peak locator 510, which is in the delay estimator 320, determines the peaks as being the maximum values of the weights wherein "longest" reads on maximum and "impulse" reads on weight.

As to **claim 23**, Bershad discloses that the delayer comprises a delayer to delay the input signal so that the second adaptive filter is substantially centered about the

estimate of the delay. Paragraph 57-58 discloses that the adaptive filter 330 contains

an input separator 450 that delays the signal of the input. Also, the second adaptive

filter would be shorter than the first adaptive filter and inherently it would be centered

about the estimate of the delay.

As to **claim 25**, Bershad discloses implementing the apparatus in a network

device including a DRAM memory (paragraph 26 lines 22-25, where in "DRAM" reads

on flash). It is noted that applicant discloses that flash is a type of memory that can be

employed and would function in the same manner as a DRAM memory.

As to **claim 26**, Bershad discloses the method of the apparatus in claim 26 (see

rejection of claim 1). Additionally, Bershad discloses a flash memory, which is

equivalent to a DRAM memory (paragraph 26 lines 22-25).

As to **claim 28**, Bershad discloses that estimating the delay comprises identifying

one or more adapted coefficients of the first adaptive filter having extreme values

relative to the other coefficients of the filter. It is noted that paragraph 37 discloses that

the delay estimator 320 determines the bulk delay in the echo channel 120 using the

estimated channel weight vector W provided by the adaptive filter. Additionally, the auto

regressive generator illustrated in fig. 4a 410 determines the vector W by completing

several iterations and paragraph 66 discloses that the peak locator can determine the

maximum value of the weights, which reads on "having extreme values relative to the

other coefficients of the filter".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-4, 10-12, 17-19 and 27 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Bershad in view of K. C. Ho and S. D. Blunt, "Rapid Identification of a

Sparse Impulse Response Using an Adaptive Algorithm in the Haar Domain" IEEE

Trans. on Signal Processing, Vol. 51, No. 3, pp. 628-638, March 2003 (hereinafter

referenced as Ho et al).

As to **claims 2- 4** Bershad meets all the limitation with the exception of disclosing

that transforming the signal comprises transforming the signal with a wavelet transform

and a partial Haar transform (page 628). However, Ho et al teaches these algorithms.

Therefore, It would have been obvious for one having ordinary skill in the art at the time

of the invention was made to transform the signals using a partial Haar or wavelet

transform for the purpose of reducing the number of coefficients required by the

adaptive filter and to "...reduce computation and speed up convergence".

As to **claims 10-12**, Bershad discloses the sequence of instructions (paragraph 26 lines 2-5) of claims 10-12 that correspond to the method steps of claims 2-4 respectively (see rejections of claims 2-4).

As to **claims 17-19**, Bershad discloses the apparatus that correspond to the method steps of claims 2-4 (see rejections of claims 2-4).

As to **claim 27**, Bershad discloses the method of the apparatus of claim 27 (see similar rejections to claims 2-4).

Claims 21, 24, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bershad.

As to **claim 21**, Bershad meets all the limitations with the exception of explicitly disclosing to have a delayer selected from a group consisting of a buffer and a delay line. Examiner takes Official Notice that several delay elements existed at the time of the invention, such as buffers, delay lines, etc. Therefore, it would have been obvious to select a buffer or a delay line as a delayer for the purpose of delaying the signal.

As to **claims 24 and 29**, Bershad meets all the limitations with the exception of explicitly disclosing that that the network device is implemented with a switch fabric. Paragraph 26 discloses that the information is implemented and forwarded to other devices using network transmission, thus making the device a network device. Additionally, it was well known in the art at the time of the invention to use switch fabric in any switch network as admitted by Applicant. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the prior art of using a switch

fabric for the purpose of efficiency and to be compatible with other technologies that the

network device would need to interact with.

Claims 7, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Van Gerwen et al, US Patent Number 4,903,247 (hereinafter referenced as Van

Gerwen).

As to **claim 7**, Bershad meets all the limitations with the exception of explicitly

disclosing that estimating the delay comprises transforming the estimate of the delay

from a transform domain to a time domain. Van Gerwen discloses that in an adaptive

filter it is possible to transform from time domain to the frequency-domain and vice

versa by means of Discrete Orthogonal transforms and it can also be illustrated in

transformations such as the discrete fourier transform and its inverse (col. 10 lines 50-

55). Therefore, it would have been obvious for one having ordinary skill in the art at the

time of the invention was made to transform the signal to a time domain for the purpose

"computation complexity and permissible signal delays" (col. 10 lines 58-60).

Additionally transforming the signals would allow interaction with other processors and

would help in determining the exact discrepancies during a transfer from a frequency

circuit to a time domain circuit.

As to **claim 14**, Bershad discloses the sequence of instructions (paragraph 26

lines 2-5) of claim14 that correspond to the method steps of claim 7 respectively (see

rejection of claim 7).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pablo R. Ovando whose telephone number is 571-272-9752. The examiner can normally be reached on M-F 7:30 am to 5:00pm, EST, Alternating Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Pendleton can be reached on 571-272-7527. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

P.O.

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